The electrolytic extraction of metals from their ores is now employed on a large scale, in the case of gold, where it can be profitably applied to the treatment of tailings and waste sludges; of zinc, especially by the recent Hoepfner method of working from the chloride; of aluminium, and of sodium. Aluminium made its first appearance as a commercial product at the Paris Exhibition of 1855. Its price at the time was not far off that of silver. The cost is now equivalent to that of copper, whilst the production has mounted to 2000 tons per annum, and is rapidly increasing. Prof. Richards, well known as the author of the most complete treatise on aluminium, predicts that it is bound to rank next to iron in its production and usefulness to mankind. The principal methods of extraction at the present time are Hall's process, consisting of an electrolytic bath of potassium fluoride, in which alumina produced from bauxite is continuously dissolved; and Heroult's process, in which the solvent consists of cryolite, the double fluoride of aluminium and sodium.

The manufacture of alkali has already undergone many changes the past twenty-five years, one of which is the supersession of the Le Blanc process by the ammonia-soda process of Hemming and Solvay. The electrolytic treatment of brine for the production of soda and chlorine now threatens to displace all the older chemical processes, especially since the introduction of the successful rocking apparatus of Castner and Kellner, in which an end-to-end flow of mercury through three compartments prevents the mixing of the electrolyte, and effects the separation of the sodium and chlorine. A similar industry is the manufacture of chlorate of potash by electrolysis, in a tank divided by a porous partition, with very thin iridio-platinum anodes and iron kathodes. The electrolyte is usually a solution of chloride of potassium maintained at a temperature of 45° to 50° C. The action of this cell results in the formation at the anode of hypochlorite, which is immediately decomposed, with the formation of chloride and chlorate of potassium. In Switzerland and in Sweden this process is worked with great commercial success by the aid of power derived from water.

Amongst the class of electro-chemical processes depending on dissociation and combination at extremely high temperatures, Mr. Swan referred to the manufacture of phosphorus and of carborundum in the Acheson furnace. To the same category belongs the production of calcium carbide and a number of analogous products obtained by Moissan. Calcium carbide, for the production of acetylene gas, is now being manufactured at the rate of 20,000 tons per annum.

The production of ozone, with its secondary derivatives, vanillin and heliotropine, is dependent on another variety of electrical action, in which intermittent or alternating currents of high tension are employed. By the Andreoli and other practical processes, ozone is now being commercially produced and applied to numerous industries, such as the oxidation of oils, the seasoning of linoleum, and the pnrification of brewers' casks.

Such are a few of the principal uses to which Volta's discovery of the galvanic current is being applied. It remains to be seen how far the electrolytic and other electrical processes will supplant the older chemical processes as time goes on. We are probably at present only on the edge of the field that remains to be explored. Mr. Swan's advice to the numerous young electricians who are setting out in life, is that some of them should turn their eyes towards the rich possibilities that await them in this direction. We often hear that the profession of electrical engineering is already crowded. Here at least is a world that still remains to be conquered.

THE BRIGHTON MUNICIPAL SCHOOL OF SCIENCE AND TECHNOLOGY.

THE accompanying illustration shows the external features of the new School of Science and Technology opened at Brighton by the Duchess of Fife a few days ago. The building was designed by Mr. F. J. C. May, the Borough Engineer and Surveyor.

On the ground floor is a large vestibule with mosaic flooring, from which a wide marble staircase leads to the top of the building. A second staircase gives access to the three floors. On each of the floors there is a corridor extending from the front to the back of the building, for a depth of 162 feet, and from these corridors the workshops, class-rooms, lecture theatres, and laboratories open out on each side, with a master's private room for each department. In the basement are situated the boilers and engines for the electric lighting of the building, and for the supply of hot water and steam for the laboratories; here also is a smithy with forges, electrical workshop, carpentering, plumbing, and brickwork and masonry shops, and a dynamo room.

On the ground floor leading from the vestibule are rooms for the Principal, Secretary, Committee, and office; on either side of the corridor are an engineering drawing hall, an engineering workshop, engineering laboratory, metallurgical furnace room, typography shop, and various class-rooms. The workshop is fitted with a Tangye's gas engine, lathes, planing, slotting and drilling machines, &c.

The first floor is devoted mainly to chemistry and physics. The lecture theatres in both departments are fine halls, capable of seating 220 and 120 respectively. The chemical laboratory is fitted for forty-eight students working at one time, and is fully equipped. Besides class and preparation rooms for each department, the accommodation on this floor comprises, among others, rooms for photometry, and advanced physics, chemical research room, balance room, and photographic dark room. The second floor contains a lecture theatre and laboratory for the natural sciences, and lecture and class rooms for dressmaking and cookery.

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The day school is a technical college, and provides extended courses in mechanical and electrical engineering, chemistry, natural sciences, and for the Arts and Science degrees of London University. The evening school provides courses in all science subjects, with practical trade classes in building, engineering, printing and chemical trades; languages, commercial subjects, and women's work. The staff of the school is composed as follows:—Principal, C. H. Draper, B.A., D.Sc.; chemistry, M. C. Clutterbuck, B.Sc., Ph.D.; natural science, H. Edmonds, B.Sc.; engineering, G. Armstrong, M.Sc. The total cost of buildings and equipment will be about 25,000*l.*

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. W. Ridgeway has been re-elected Disney Professor of Archæology.

Mr. Yule Oldham, University Lecturer in Geography, lectures this term on the Geography of Central Europe, and on Physical Geography, on Mondays and Thursdays respectively. He is also giving an extension course in the town on the Great Explorers, which is largely attended.

Sir Ernest Clarke, Gilbey Lecturer, gives his second series of lectures on Agricultural History and Economics on Thursdays during February, at noon, in St. John's College.

Mr. Osbert Salvin, F.R.S., and Mr. Ainger, Master of the Temple, have been elected to Honorary Fellowships at Trinity Hall.

MR. JOHN D. ROCKEFELLER has just given the Chicago University 200,000 dols., this being in addition to many previous gifts.

THE following are among recent appointments:—Dr. Julius Istvánffy to be professor of botany at Klausenburg; Dr. Alexander Mágócsy-Dietz to be assistant professor of botany at Budapest; and Prof. Dr. Zacharias to be director of the Botanic Garden at Hamburg.

THE Finance Committee of the Corporation have recently reported on the application of the Council of the City and Guilds of London Institute for a renewal of the grant from the Corporation to the funds of the institute. They state from inquiry that the work of the institute has been successfully and economically managed, and the results achieved are fully commensurate with the expenditure involved. The Corporation have, in consequence of this report, voted 400*l.* in respect of last year towards the funds of the institute, to be devoted to the Finsbury Technical College.

A COPY of the Calendar of the University College of Sheffield has been received. It will be remembered that the present College was constituted by Royal Charter last May, and was formed by the amalgamation of three pre-existing institutions—the Firth College, the Sheffield Technical School, and the Sheffield School of Medicine. These institutions had previously worked hand in hand, although under independent governing bodies. By the charter they were merged into one corporation with a single Court of Governors. The new Calendar shows that the College is doing valuable work by providing the people of Sheffield and the district with the means of higher scientific and literary education by University methods of teaching.

AT a meeting of Convocation of the University of London on Monday, the report of the special committee appointed to consider the Commission Bill was adopted. After a discussion the following resolution, recommended by the special committee and moved by Dr. J. B. Benson, was carried, an amendment to it being rejected by seventy-six votes to forty-two: "That this House accepts the scheme embodied in the London University Commission Bill, 1897." The special feature of the resolution adopted rests upon the fact that it was supported by one of the sections that had always hitherto opposed the Cowper scheme. The opponents belong to two classes: the no change—that is, the two Universities section, who are still irreconcileable, and the section which favoured procedure by charter, and not by statutory commission. It was this section that was mainly responsible for the compromise embodied in the Bill of last year—a compromise which has been accepted by all the bodies concerned, and which Convocation has now approved.

THE annual general meeting of the Incorporated Association of Head Masters was held on Thursday last. Resolutions were passed referring to the new regulations of the matriculation examination of the University of London, the dates of scholarship examinations at Oxford and Cambridge, and the training of teachers. At the second day's meeting of the Association, this year's president, the Rev. A. R. Vardy, Head Master of King Edward's School, Birmingham, delivered an address in which he referred to some of the more important educational work accomplished by the Association during the past year. The Rev. R. D. Swallow, in moving "That this Association approves the steps taken by its representatives at the Delimitation Conference held at the Education Department, and hereby adopts the joint memorandum as agreed to at the conference," remarked that the conference, though under the chairmanship of Sir G. Kekewich, was unofficial. It was understood by all that State aid would be needed by secondary schools if they were to take their proper place. The great aim recognised in the memorandum was that the object of secondary schools was to form character in its fullest sense. As to application of principles, the masters of higher grade schools had acknowledged that there must be differentiation. The higher grade schools accepted a place as definitely higher primary schools. These schools had also accepted the assignment of scholarships to primary and secondary schools, and claimed no exclusive use of public funds. The Association also accepted the position that, being primary, these higher grade schools should also be free. There was also a common agreement as to a central authority. After some discussion, the resolution was adopted. A resolution was also carried to the effect that Parliamentary assistance was needed both for the cost of annual maintenance and the provision and equipment of adequate buildings for secondary education.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 16, 1897.—"On the Thermal Conductivities of Single and Mixed Solids and Liquids, and their Variation with Temperature." By Dr. Charles H. Lees, Assistant Lecturer in Physics in the Owens College.

These experiments were undertaken with a view to determining the effect of temperature on thermal conductivities, and the relation between the conductivity of a mixture and the conductivities of its constituents. About thirty solids, liquids, substances near their melting points, and mixtures of liquids, were tested between temperatures of 15° and 50° C., and the following statements embody the results:—

(1) Solids not very good conductors of heat in general decrease in conductivity with increase of temperature in the neighbourhood of 40° C. Glass is an exception to this rule.

(2) Liquids follow the same law in the neighbourhood of 30° C.

(3) The conductivity of a substance does not invariably change abruptly at the melting point.

(4) The thermal conductivity of a mixture lies between the conductivities of its constituents, but is not a linear function of its composition.

(5) Mixtures of liquids decrease in conductivity with increase of temperature in the neighbourhood of 30° C., at about the same rate as their constituents.

"On the Biology of *Stereum hirsutum*, Fr." By H. Marshal Ward, Sc.D., F.R.S., Professor of Botany in the University of Cambridge.

The author has cultivated the mycelium of this fungus obtained from spores, on sterilised wood, and after several months the cultures developed yellow bosses which proved to be the hymenophores bearing the basidia. This fungus has not hitherto been made to produce spores in cultures, and Basidiomycetes generally have rarely been made to do so. The actions of the mycelium on the wood of *Æsculus*, *Pinus*, *Quercus*, and *Salix* are also examined, and this is, so far as known, the first time this has been done with pure cultures.

Mathematical Society, January 13.—Prof. Elliott, F.R.S., President, in the chair.—The President informed the Members of the recent decease of Signor Brioschi, a Foreign Member of the Society, gave a slight sketch of some of his work, and dwelt upon the loss occasioned by his death to the mathematical

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